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10/544,120

08/02/2005

Yoshiaki Ohbayashi

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EXAMINER

PRITCHARD, JASMINE L

ART UNIT

PAPER NUMBER

2614

MAIL DATE

DELIVERY MODE

02/06/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/544,120

Applicant(s)

OHBAYASHI ET AL.

Examiner

JASMINE PRITCHARD

Art Unit

2614

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 November 2008.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
4a) Of the above claim(s) 1-8 and 16 is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 9-15 and 17-19 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 02 August 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 2/28/2006, 7/19/2006 and 10/20/2006.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

This communication is responsive to the provisional election made WITH traverse on 11/21/2008 to prosecute the invention of Group I, claims 9-15 and 17-19. Other groups, including claim 16 are withdrawn from consideration, as being drawn to a non-elected invention. A complete reply to a future final office action must include cancellation of non-elected claims or other appropriate action (37 CFR 1.144). See MPEP § 821.01.

Applicant's election with traverse of Group I in the reply filed on 11/21/2008 is acknowledged. The traversal is on the ground(s) that no serious burden exists on the Examiner by examining the claims of Group I and II in a single application. This is not found persuasive because claim 16 is directed to a method of manufacturing a sound detecting mechanism, which is classified in class 29/594. Therefore causing a serious burden to search for the Examiner because Group I is classified in class 381/174.

The requirement is still deemed proper and is therefore made FINAL.

Drawings

1. Figure 5 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR

1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters "304" and "B" have both been used to designate Diaphragm. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters "304" and "B" have both been used to designate Membrane. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and

informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters "305" and "D" have both been used to designate Spacer. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

5. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters "305" and "D" have both been used to designate Sacrificial layer. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

6. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters "306" and "C" have both been used to designate Back Electrode. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

7. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters "305" and "D" have both been used to designate Polycrystal Silicon film. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

8. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the “SOI wafer” must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

9. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the “active layer” must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet,

even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

10. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the silicon nitride film held between a built0in oxide film layer and the base is used as the support substrate in Claim 11 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the

renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The disclosure is objected to because of the following informalities: the term "SOL" needs to be described in the specification.

Appropriate correction is required.

Double Patenting

A rejection based on double patenting of the "same invention" type finds its support in the language of 35 U.S.C. 101 which states that "whoever invents or discovers any new and useful process ... may obtain a patent therefor ..." (Emphasis added). Thus, the term "same invention," in this context, means an invention drawn to identical subject matter. See *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894); *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957); and *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970).

A statutory type (35 U.S.C. 101) double patenting rejection can be overcome by canceling or amending the conflicting claims so they are no longer coextensive in scope. The filing of a terminal disclaimer cannot overcome a double patenting rejection based upon 35 U.S.C. 101.

Claim 9 is provisionally rejected under 35 U.S.C. 101 as claiming the same invention as that of claims 14 of copending Application No. 10/565,059. This is a provisional double patenting rejection since the conflicting claims have not in fact been patented.

| <u>10/544120</u> | <u>10/565,059</u> |
|---|---|
| <p>Claim 9:</p> <p>A sound detecting mechanism comprising a pair of electrodes forming a capacitor on a substrate in which one of the electrodes is a back electrode forming perforations therein corresponding to acoustic holes and the other of the electrodes is a diaphragm, wherein a silicon nitride film is provided on a side adjacent a base of the substrate with respect to a membrane acting as the diaphragm formed on the substrate.</p> | <p>Claim 14:</p> <p>A sound detecting mechanism comprising a pair of electrodes forming a capacitor on a substrate in which one of the electrodes is a back electrode forming perforations therein corresponding to acoustic holes and the other of the electrodes is a diaphragm, wherein the diaphragm is made of at least one of a metal film and a laminated film, the metal film being formed by at least one of sputtering in a low temperature process, vacuum vapor deposition and plating technique, the laminated film being formed of an organic film, a conductive film, or any combination thereof, the back electrode is formed on the substrate, and a spacer is formed from part of a sacrificial layer comprising an organic film for determining a distance between the diaphragm and the</p> |

| | |
|--|-----------------|
| | back electrode. |
|--|-----------------|

A rejection based on double patenting of the "same invention" type finds its support in the language of 35 U.S.C. 101 which states that "whoever invents or discovers any new and useful process ... may obtain a patent therefor ..." (Emphasis added). Thus, the term "same invention," in this context, means an invention drawn to identical subject matter. See *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894); *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957); and *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970).

A statutory type (35 U.S.C. 101) double patenting rejection can be overcome by canceling or amending the conflicting claims so they are no longer coextensive in scope. The filing of a terminal disclaimer cannot overcome a double patenting rejection based upon 35 U.S.C. 101.

Claims 9 and 10 are rejected under 35 U.S.C. 101 as claiming the same invention as that of claims 1, 4 and 5 of prior U.S. Patent No. 7,386,136. This is a double patenting rejection.

| <u>10/544,120</u> | <u>10/544,253</u> |
|---|---|
| Claim 9: A sound detecting mechanism comprising a pair of electrodes forming a capacitor on a substrate in which one of the electrodes is a back electrode forming perforations therein corresponding to acoustic holes and the other of the electrodes is a diaphragm, wherein a silicon nitride film is provided on a side adjacent a base of the substrate | Claim 1: A sound detecting mechanism comprising a pair of electrodes forming a capacitor on a substrate in which one of the electrodes is a back electrode forming perforations therein corresponding to acoustic holes and the other of the electrodes is a diaphragm, wherein a multilayered assembly is mounted on the substrate, the multilayered |

with respect to a membrane acting as the diaphragm formed on the substrate.

assembly formed of the diaphragm, a sacrificial layer and the back electrode superposed in series by vapor deposition technique; the sacrificial layer is etched relative to the multilayered assembly formed of the diaphragm, the sacrificial layer and the back electrode, thereby defining a void area between the diaphragm and the back electrode, with the sacrificial layer remaining at outer peripheral portions of the void area; and the back electrode being formed by polycrystal silicon of 5 .mu.m to 20 .mu.m in thickness; and the substrate comprises a single crystal silicon on insulator (SOI) structure wafer including a silicon oxide film or a silicon nitride film formed on a monocrystal silicon substrate and a polycrystal silicon film formed on the silicon oxide film or the silicon nitride film.

Claim 10:

The sound detecting mechanism of

Claim 4:

The sound detecting mechanism of

| | |
|---|---|
| <p>claim 9, wherein the substrate includes a support substrate having a monocrystal silicon substrate acting as the base thereof,</p> <p>wherein an SOI wafer having the silicon nitride film held between an active layer and a built-in oxide film layer is used as the support substrate whereby the active layer forms the diaphragm.</p> | <p>claim 1, wherein the substrate comprises a support substrate having a monocrystal silicon substrate acting as the base thereof; and the support substrate consists of a single crystal silicon on insulator (SOI) wafer.</p> <p>Claim 5:</p> <p>The sound detecting mechanism of claim 4, wherein the single crystal silicon on insulator (SOI) wafer has an active layer used as the diaphragm.</p> |
|---|---|

Claim Objections

1. Claim 15 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. The doping process is a manufacturing step not a structure feature; therefore it fails to further limit the independent claim 9 which it is dependent on. The Examiner suggests that the dependency of claim 15 be made to depend on the non elected method claim 16.

2. Claim 11 is objected to because of the following informalities: Please see drawing object #10. Appropriate correction is required.
3. Claims 10 and 11 are objected to because of the following: the term single crystal silicon on insulator needs to be inserted before “SOI”.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1. Claims 9-15 and 17-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
2. In claim 9, line 2, the applicant states “...electrodes forming a capacitor on a **substrate** in which ...”) and in lines 4 and 5 the applicant states “... the substrate ...” In the Specification and the Drawings the Applicant has defined a [A – support substrate] and [301—monocrystal silicon substrate]. As shown above the Applicant only claims “a substrate”. Therefore the Applicant has failed to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
3. In claims 10-13, in line 2, “the substrate” is indefinite for the same reasons above.

4. Claims 14, 15 and 17-19 are rejected to as being dependent upon a rejected base claim.

See above.

5. In claim 12, line 4, the applicant states "...and a **silicon film** is further ..."). In the Specification and the Drawings the Applicant has defined a [302 – silicon oxide film] and [303 – silicon nitride film]. As shown above the Applicant only claims "a silicon film". Therefore the Applicant has failed to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

6. Claim 14, it is not clear what the Applicant meant by "a silicon substrate of orientation is used ..."

7. Claim 15 recites the limitation "the impurity diffusion treatment" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 10 is rejected under 35 U.S.C. 102(b) as being anticipated by Loeppert (US 5,490,220).

Regarding Claim 9:

Loeppert teaches a sound detecting mechanism (See title **and** notice “*Solid State Condenser and Microphone Devices*”) comprising a pair of electrodes (12 – *diaphragm and* 64 – *backplate and* see column 1, lines 16-17 **and** notice “*A typical condenser microphone is composed of ... a diaphragm/backplate pair forming a capacitor*”, note the pair of electrodes forming a capacitor on a substrate is a well known process.) forming a capacitor on a substrate (14 – *silicon wafer*) in which one of the electrodes is a back electrode (64 – *backplate*) forming perforations (66 – *perforations*) therein corresponding to acoustic holes and the other of the electrodes is a diaphragm (12 – *diaphragm*), wherein a silicon nitride film (30 – *nitride layer*) is provided on a side adjacent a base (See Figure 6 **and** notice the Examiner defines the base of the substrate as 14 – *silicon wafer*) of the substrate (See Figure 6 **and** notice a *silicon nitride film is provided on a side adjacent a base of the substrate with respect to a membrane acting as the diaphragm formed on the substrate*) with respect to a membrane (44 – *connecting layer*) acting as the diaphragm (12 – *diaphragm*) formed on the substrate (14 – *silicon wafer*, **please note** to the best of the Examiners knowledge, the Examiner has defined “substrate” as 301- monocrystal silicon).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 10-15 and 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Loeppert (US 5,490,220).

Regarding Claim 10:

Loeppert teaches a sound detecting mechanism (See title **and** notice “*Solid State Condenser and Microphone Devices*”), wherein the substrate (14 - *silicon wafer*) includes a support substrate (14 - *silicon wafer*) having a silicon substrate (14 - *silicon wafer*) acting as the base (14 - *silicon wafer*) thereof, wherein an SOI wafer (Figure 6 **and please note** to the best of the Examiners knowledge, the Examiner has defined “SOI wafer” as the entire microphone unit of Figure 6) having the silicon nitride film (30 – *nitride layer*) held between an active layer (44 – *connecting layer*) and a built-in oxide film layer (16 – *oxide film layer*) is used as the support substrate (See Figure 6) whereby the active layer forms the diaphragm (12 – *diaphragm*).

Loeppert does not specifically teach or restrict a monocrystal silicon substrate (14 - *silicon wafer*). However, it is well known in the art to provide monocrystal silicon for the substrate in capacitive acoustic transducers or sound detecting mechanisms.

Regarding Claim 11:

Loeppert teaches a sound detecting mechanism (See title **and** notice “*Solid State Condenser and Microphone Devices*”), wherein the substrate (14 - *silicon wafer*) includes a support substrate (14 - *silicon wafer*) having a silicon substrate (14 - *silicon wafer*) acting as the base (14 - *silicon wafer*) thereof, wherein an SOI wafer (Figure 6 **and please note** to the best of the Examiners knowledge, the Examiner has defined “SOI wafer” as the entire microphone unit of Figure 6) having the silicon nitride film (30 – *nitride layer*) held between a built-in oxide film layer (16 – *oxide film layer*) and the base is used as the support substrate (14 - *silicon wafer*). Loeppert does not specifically teach or restrict a monocrystal silicon substrate (14 - *silicon wafer*). However, it is well known in the art to provide monocrystal silicon for the substrate in capacitive acoustic transducers or sound detecting mechanisms.

Regarding Claim 12:

Loeppert teaches a sound detecting mechanism (See title **and** notice “*Solid State Condenser and Microphone Devices*”), wherein the substrate (14 - *silicon wafer*) includes a support substrate (14 - *silicon wafer*) having a silicon substrate (14 - *silicon wafer*), wherein a silicon oxide film (16 – *oxide film layer*) is formed on the support substrate (14 - *silicon wafer*), the silicon nitride film (30 – *nitride layer*) is formed on the silicon oxide film (16 – *oxide film layer*), and a silicon film (24 – *silicon nitride layer*) is further formed on the silicon nitride film (30 – *nitride layer*). Loeppert does not specifically teach or restrict a monocrystal silicon

substrate (14 - *silicon wafer*). However, it is well known in the art to provide monocrystal silicon for the substrate in capacitive acoustic transducers or sound detecting mechanisms.

Regarding Claim 13:

Loeppert teaches a sound detecting mechanism (See title **and** notice “*Solid State Condenser and Microphone Devices*”), wherein the substrate (14 - *silicon wafer*) includes a support substrate (14 - *silicon wafer*) having a silicon substrate (14 - *silicon wafer*) acting as the base (14 - *silicon wafer*) thereof, wherein a laminated layer consisting of a silicon oxide film (16 - *oxide film layer*) and the silicon nitride film (30 - *nitride layer*) is formed between the membrane (44 - *connecting layer*) acting as the diaphragm (12 - *diaphragm*) and the support substrate (14 - *silicon wafer*), where the thickness of the silicon nitride film (30 - *nitride layer*) is selected within a range of 0.1 .mu.m through 0.6 .mu.m (column 3, line 45). Loeppert does not explicitly teach or reject a film thickness ratio, (silicon oxide film)/(silicon nitride film)=R, is determined as $0 < R \leq 4$ for the purpose of gaining a desired frequency. However, Loeppert does not limit any thickness ratios. Therefore it would have been obvious to one skilled in the art at the time of the invention to provide any thickness ratio depending on the applications and the desired frequency characteristics.

Regarding Claims 14 and 17-19:

Loeppert teaches a sound detecting mechanism (See title **and** notice “*Solid State Condenser and Microphone Devices*”). Loeppert does not specifically teach or restrict a silicon substrate (14 - *silicon wafer*) of orientation is used as the monocrystal silicon substrate.

However, it is well known in the art to provide monocrystal silicon for the substrate in capacitive acoustic transducers or sound detecting mechanisms.

Regarding Claim 15:

Loeppert teaches a sound detecting mechanism (See title **and** notice “*Solid State Condenser and Microphone Devices*”). Loeppert does not explicitly teach or restrict the impurity diffusion treatment is executed on the diaphragm. However this process of “doping” is well known in the art for the purpose of etching.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Loeppert et al. U.S. Patent 5,870,482 and US PGPub 2002/0067663 A1.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JASMINE PRITCHARD whose telephone number is (571)270-3712. The examiner can normally be reached on Monday-Friday 7:30am-5:00pm est.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis Kuntz can be reached on 571-272-7499. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jasmine Pritchard/
Examiner, Art Unit 2614

/Suhan Ni/
Primary Examiner, Art Unit 2614